

The technical and business challenges in wide deployment of WLAN Hotspot Networks

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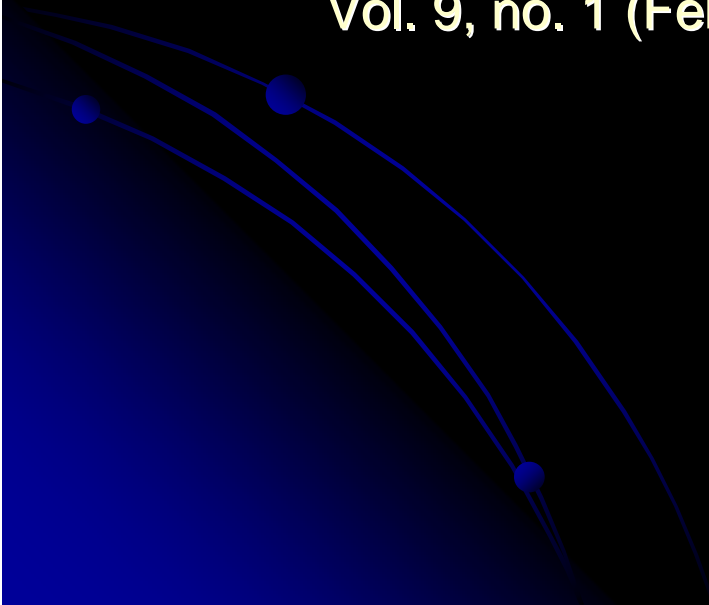
ACM WMASH 2003 Panel, Sept. 19, 2003

Disclaimer

These are my personal opinions only and not necessarily that of Microsoft Corporation

Reference

P. Bahl, A. Balachandran et. al, "*PAWNs: Satisfying the Need for Ubiquitous Secure Connectivity and Location Services*," IEEE Wireless Communications, Vol. 9, no. 1 (February 2002)



Hardware Growth & Costs

- Analysts project 48 million 802.11-enabled Laptops and PDA's by 2007
- Gartner forecasts over 16 million access points and over 100 million LAN adapters worldwide by 2005
- Prices for access points and adaptors continue to fall, with more than 50 vendors shipping equipment
 - Enterprise APs dropped from \$1000 to \$375 with a 20x volume increase in 2001
 - Retail adaptor prices went from \$250 to \$50
 - BOM has dropped below \$5 for .11b chip sets
- Growth of WiFi Phones

WiFi phones?

- Motorola announced a Wi-Fi phone for VoIP (early 04)
- Nokia
 - D211 GPRS/Wi-Fi PC Card available now
 - GPRS/Wi-Fi phone beta in late 2003
- Qualcomm MSM7000 chip with integrated ARM CPU, CDMA, and Wi-Fi (early 04)
- HP & Dell have announced integrated phone/Wi-Fi PPCs in 04

Wi-Fi Landscape

Major Operators:

- T-Mobile
- TeliaSonera
- AT&T Wireless
- Verizon Wireless

Aggregators:

- GRIC
- IPass
- Boingo
- rovingIP.net

Emerging National (U.S.) Operators:

- Wayport
- Cometa

Hot Spot Operators:

- Azure Networks
- Sip'n'Surf
- Air-2-Lan
- FatPort
- Broadreach Networks
- Broadband Express
- Pronto Networks

Other emerging Branded Service Providers:

- Earthlink
- AOL

Wi-Fi Landscape: Addl. Stake Holders

IBM & Accenture

- Backend services

Intel, TI, AMD

- WiFi chips and mobile services

Cisco

- IOS on WiFi networking

Toshiba, Apple

- Experience

HP

- Hardware

Reality in Pictures



What do I know about this subject..

The Choice Network (Jan. 1999 – Nov. 2001)

- First Public Area WiFi Network (PAWN)
- Deployed in Crossroads Shopping Center, Bellevue, Washington, USA

Features

- Intranet and Internet access
- Global authentication
- Privacy for users and security for operators
- Differentiated services based on policies
- Location based services
- Roaming support between multiple networks
- Packet level accounting
- Ease of deployment



Broadband wireless Internet connectivity & location services in public places: <http://www.mschoice.com>



Eat, Drink and Be Connected

You can now access the corpnet and Internet at Crossroads Shopping Center using the same wireless technology ITG has deployed in this building.

Enjoy a great meal, listen to live music, watch the passing parade – while doing your e-mail, collaborating with campus colleagues on a presentation or doing research on the Web.

Microsoft Research is testing a suite of wireless access protocols and applications in a trial at Crossroads. To participate you will need to provide your own hardware (e.g. a laptop and ITG-approved 802.11 wireless network card) and install some beta software. If you're interested, please email choice@microsoft.com, or check out <http://choice.com>.

CROWN
Crossroads
Wireless
Network

Sign up now!

Microsoft

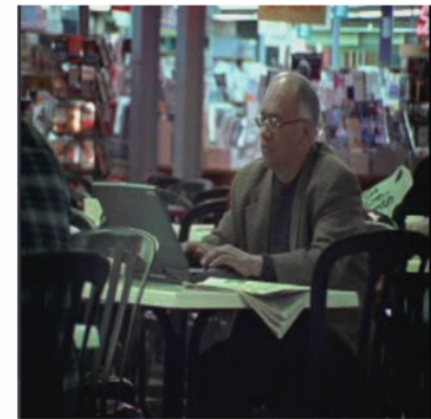
Choice



Microsoft
Research

The
CHOICE
Network

Version: Beta 1
Copyright (c) 2000
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Business Models

WISP Start-ups

Cellular Operators buy out / Invest in WISPs

- Wi-Fi fills in 3G gaps and provides higher speed
 - T-Mobile runs the hotspots in Starbucks
 - Sprint invested in Boingo

Organic Growth

The CHOICE Network

- Global authentication
- Individual Centric
- Cost and maintenance of equipment & services by local entity
- Tuned services: e.g. context and location aware

PAWN Customers

Initial target - Individuals

- Not very successful
- Chicken and egg problem, not enough hot-spots, subscriber fee is high, few takers

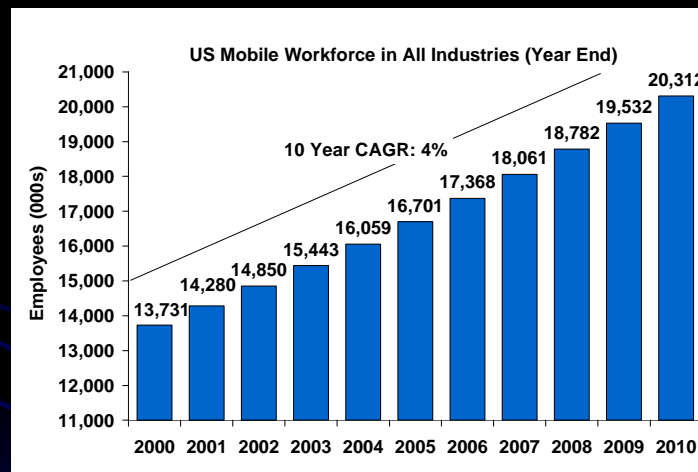
● Evolving towards Businesses

- Rethinking, go after the mobile workforce

Here's the justification.....

Mobile Workforce

2005 Estimate: 4.5 million users out of 16 million mobile workers will use PAWNs

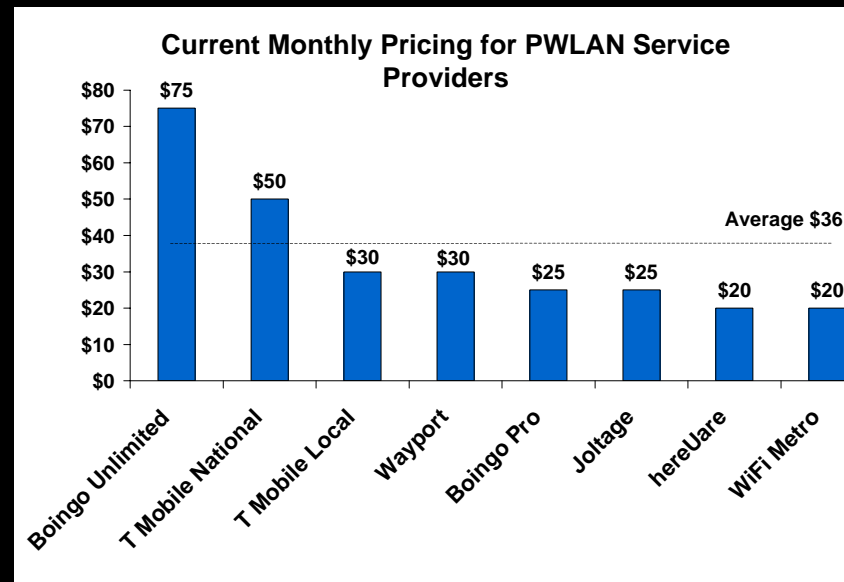


In 2005 82% of all business laptops will include WiFi versus 37% of Consumer laptops

Hope: The mobile workforce will drive a need for increasingly greater hot spot deployment

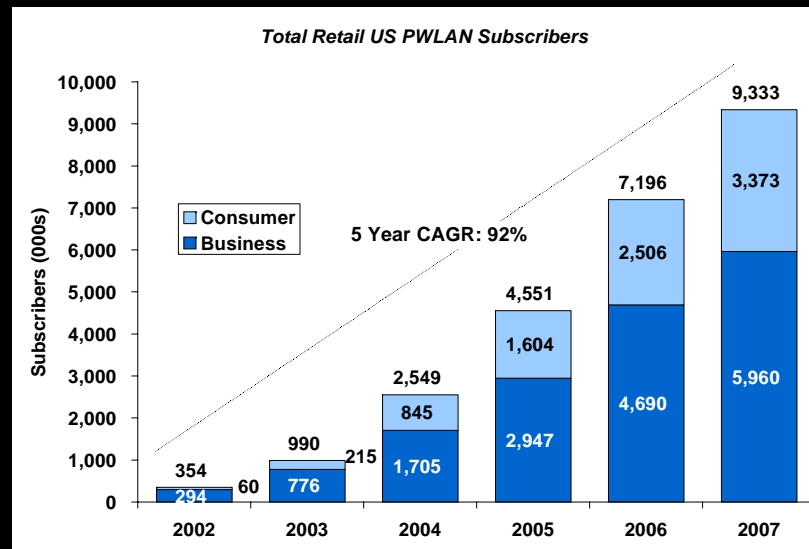
What about Subscriber Cost?

Hope: Pressure from competition will continue to drive down pricing over time while also fueling hot spot buildout



Want: Pricing needs to get below \$25/month

PAWN Market



~9 million subscribers paying \$25 / month results in a **\$2.7 billion** services market by 2007.

So, what am I we saying ...

The CHOICE model is good

Small hotspot operators (WISPs) have tried & failed

- e.g. Mobilestar bankruptcy

Large Telcos can't cover it all (not growing fast enough)

- Ignore small businesses (malls, restaurants, museums etc.)
- Impacting the mobile workforce alone is not enough
- Benefits of hardware cost reduction not passed on to user

Win-Win for all: Organic Growth (CHOICE)

- Targets the individual
- Small businesses become hot-spots (greater overall coverage)
- All stakeholders benefit
- Easy to incorporate location services

Thanks!

Details in:

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